POTA, Gy.

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Bibliograficky katalog, CSR, Slovenske khihy, Vol. VIII. 1957. No. 9. p. 280.

POTA, Gyorgyne

Up-to-date installations of the Hungarian Radio.III. Radiotechnika 12 no.4:124-125 Ap '62.

POTA, Gyorgy

Sewage problems in the food industry. II. Elelm ipar 14
no.6:182-186 Je '60.

1. Elelmezesipari Tervezo Intezet.

POTA, Gyorgy

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1. Elelmezesipari Tervezo Intezet.

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Up-to-date equipments of the Hungarian radio; where the voice of peace and culture is in the making. Radiotechnika 12 no.3: 90-91 Mr '62.

POTA, Laszlo, dr.

Lessons from the 8th International Congress on Cancer held in Moscow. Vasut 12 no.10:14-15 25 O '62.

1. MAV Korhaz rontgen-osztalyanak vezetoje.

VAJDA, Gyorgy, dr.; POTA, Laszlo, dr.; THUROCZY, Zsuzsa, dr.

Coronary disease and cervical spondylosis. Orv. hetil. 104 no.43:2024-2028 27 O '63.

1. MAV Korhaz es Kosponti Rendelo.

(CORONARY DISEASE) (SPONDYLITIS, ANKYLOSING)
(CERVICAL VERTEBRAE) (ELECTROCARDIOGRAPHY)
(RADIOGRAPHY)

POTABENKO, S. N.

Dissertation defended for the degree of Candidate of Philological Sciences at the Institute of the People of Asia

"Hindi Dramaturgy in the Struggle for Independence."

Vestnik Akad. Nauk, No. 4, 1963, pp 119-145

POTACH, S. [Potac, S.]

Several measures in the field of issuing credit and making payments in Czechoslovakia. Den.i kred. 18 no.1:47-51 Ja '60. (MIRA 13:1)

1. Chlen Pravleniya Gosbanka Chekhoslovakii.
(Czechoslovakia--Credit) (Czechoslovakia--Payment)

POTACH, S. [Potac, S.]

Planning and administration of currency circulation in Czechoslovakia. Den.i kred. 18 no.2:47-54 F '60. (MIRA 13:1)

(Czechoslovakia--Money)

DERLIKOWSKI, Jerzy; NARBUTT-MERING, Alina Barbara; PERKOWSKI, Edward; WEGLOWSKA, Wanda; POTAJLO-GULINSKA, Joanna

Use of paper iontophoresis for the separation of some drug mixtures. Acta Pol pharm. 21 no.1:9-18 '64.

1. Z Zakladu Chemii Analitycznej Instytutu Lekow (Kierownik: doc. mgr inz. Z. Margasinski).

Potak, E. M.

8
4E3d
4E4s

Diacetone-L-sorbose. L. A. Rubtsov, M. V. Bulyakina, E. M. Potak, R. I. Filippovich, K. V. Linets, A. P. Nechaev, and N. A. Belel'man. U.S.S.R. 106,842, Aug. 25, 1957. Diacetone-L-sorbose is oxidized to diacetone-2-oxo-L-gulonic acid in a continuous process with NaOCl using NiO as catalyst. M. Hoseh

1/1
MB

MAGAZINER, S. I. and POTAK, I. M.

"Influence of heat treatment on the strength of steel," Journal of Tech. Physics, Vol.20, No. 11, 1950.

POTAK, M. G., Engineer

"Comparative Investigation of Black Pigments for Printing Dyes." Sub 3 Mar 47, Moscow Polygraphic Inst, Ministry of Higher Education USSR.

Dissertations presented for degrees in science and engineering in Moscow in 1947.

SO: Sum.No. 457, 18 Apr 55

POTAK, Ya. M.

Natiag boltov - prichina khrupkogo razrusheniia vysokoprochnykh tavrikov lonzheronov. (Tekhnika vozdushnogo flota, 1945, no. 7/8, p. 34-41, illus., diagrs.)

Title tr.: Over-tightening of bolts as a cause of brittle destruction of high-strength longeron T-connections.

TL504.T4 1945

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

POTAK, YA. M.

Mar 47

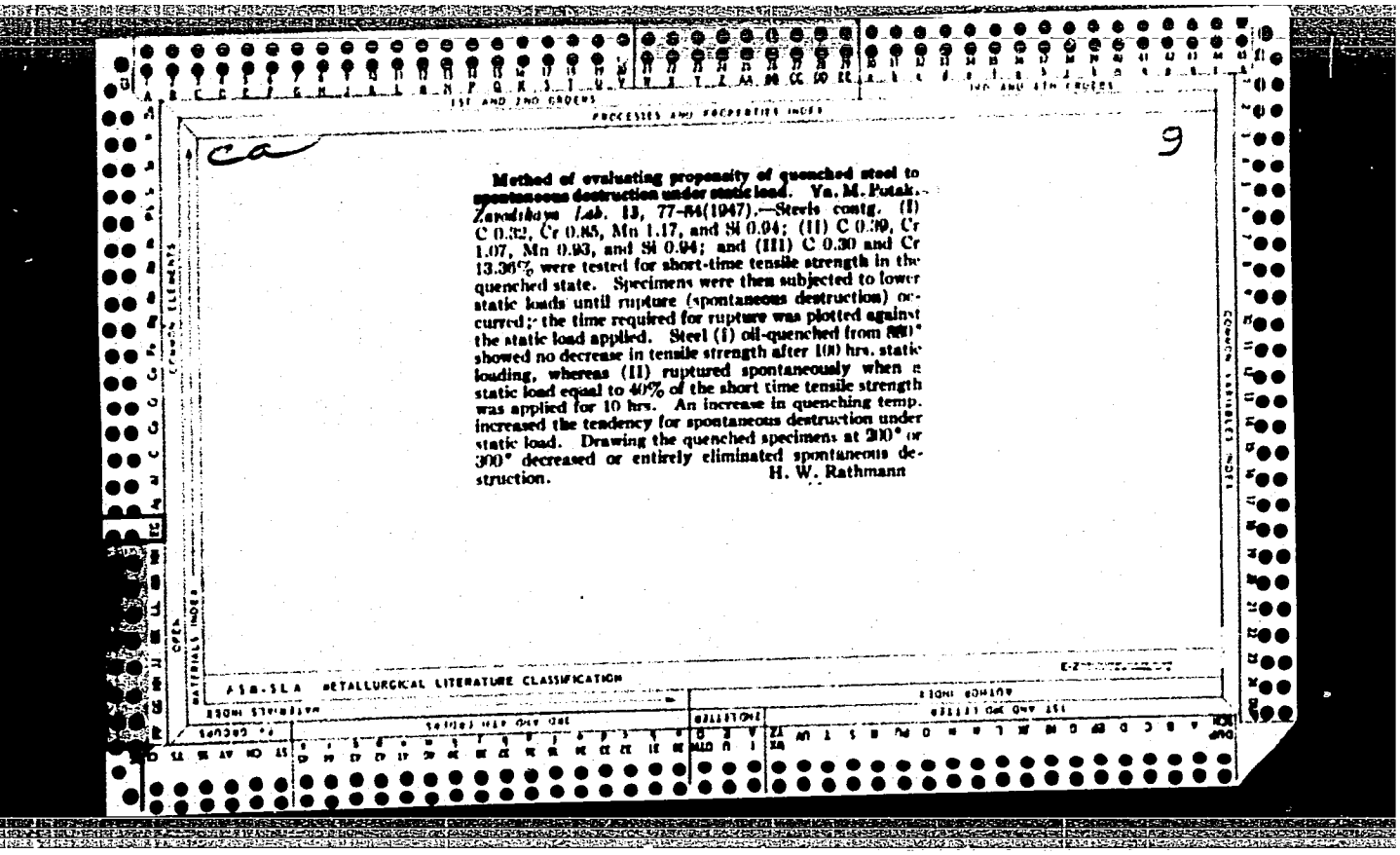
USSR/Aeronautics
Steel, Temper Brittleness
Aircraft - Materials

"Resistance of Tempered Steels to Fracture," Ya. M. Potak, Cand Tech Sci, S. I. Magazanik, 7pp

"Tekh Voz Flota" No 4 (228)

In the vast majority of cases broken plane structure shows evidence of brittleness with no traces of plate deformation. It has been found that metal which has been heat treated at 500°C is able to withstand break loading of 110 - 130 kilograms per square millimeter and very rarely shows evidences of being brittle.

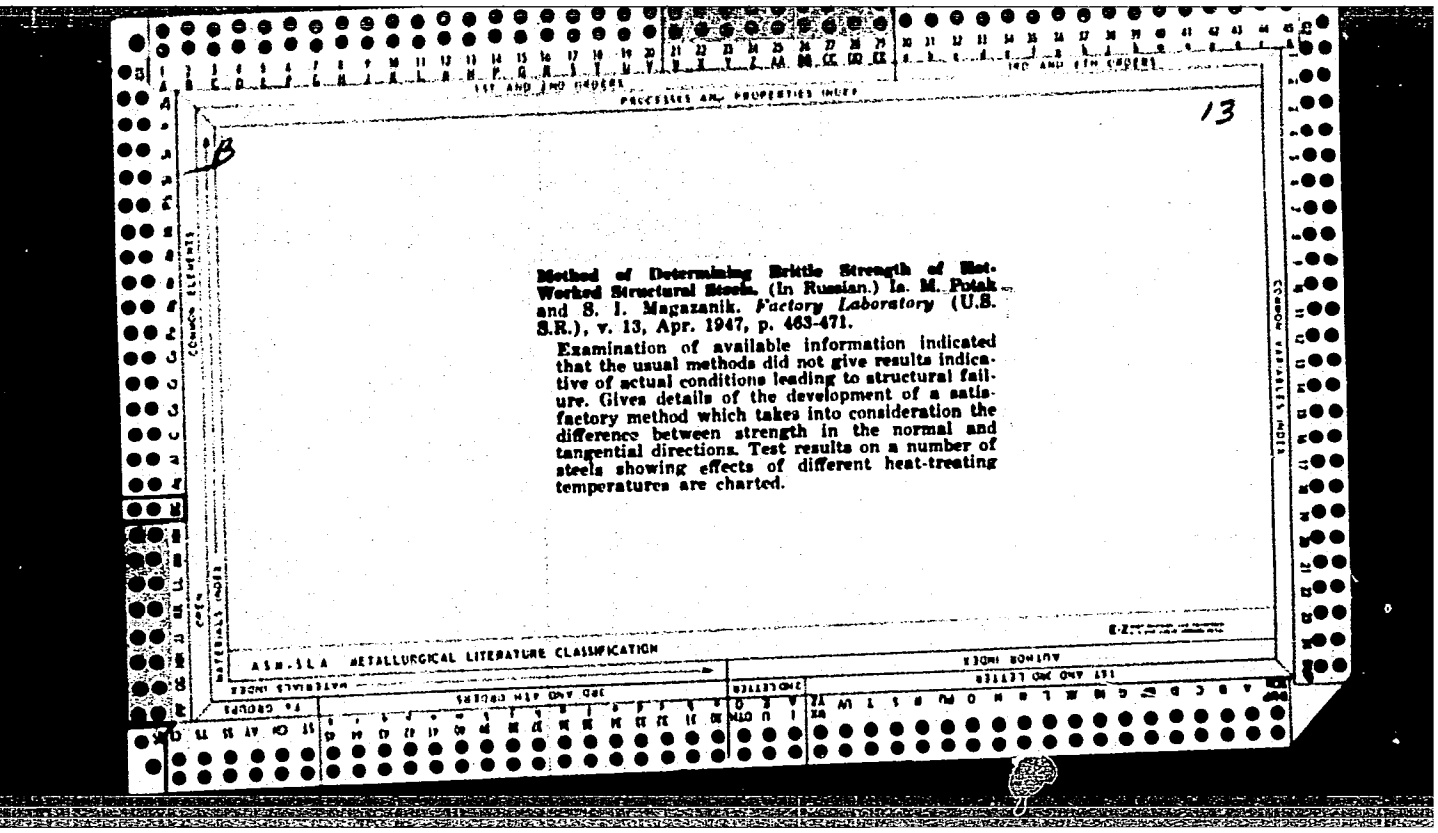
PA 28T7



9

Method of evaluating propensity of quenched steel to spontaneous destruction under static load. Ya. M. Potak. *Zavodskaya Lab.* 13, 77–84(1947).—Steels contg. (I) C 0.32, Cr 0.85, Mn 1.17, and Si 0.94; (II) C 0.39, Cr 1.07, Mn 0.93, and Si 0.94; and (III) C 0.30 and Cr 13.36% were tested for short-time tensile strength in the quenched state. Specimens were then subjected to lower static loads until rupture (spontaneous destruction) occurred; the time required for rupture was plotted against the static load applied. Steel (I) oil-quenched from 880° showed no decrease in tensile strength after 100 hrs. static loading, whereas (II) ruptured spontaneously when a static load equal to 40% of the short time tensile strength was applied for 10 hrs. An increase in quenching temp. increased the tendency for spontaneous destruction under static load. Drawing the quenched specimens at 200° or 300° decreased or entirely eliminated spontaneous destruction.

H. W. Rathmann



13

Method of Determining Brittle Strength of Hot-Worked Structural Steels. (In Russian.) Ia. M. Potak and S. I. Magazanik. *Factory Laboratory* (U.S.S.R.), v. 13, Apr. 1947, p. 463-471.

Examination of available information indicated that the usual methods did not give results indicative of actual conditions leading to structural failure. Gives details of the development of a satisfactory method which takes into consideration the difference between strength in the normal and tangential directions. Test results on a number of steels showing effects of different heat-treating temperatures are charted.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

POTAK, Ya. M., and E. R. SHOR.

Termicheskaia obrabotka stalei dlia samoletostroeniia. Pod red. N. M. Skliarova. Moskva, Oborongiz, 1948. 346 p.

Title tr.: Heat treatment of steels for aircraft construction.

NCF

SO: Aeronutical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

PA 41T96

USSR/Metals Jan 1948
Steel Alloys
Steel - Tensile Strength

"The Effect of Alloying Elements on the Resistance to Friability of Highly Tensile Steels," Ya. M. Potak, Candidate Tech Sci, Ye. L. Bushmanova, Engr, VIAM, 4½ pp

"Stal'" No 1

Author states that the friability of parts from highly tensile steels, due to loading, is usually due to the friability of alloying materials added to the molten steel to increase the tensile strength. Discusses results of his experiments, showing that

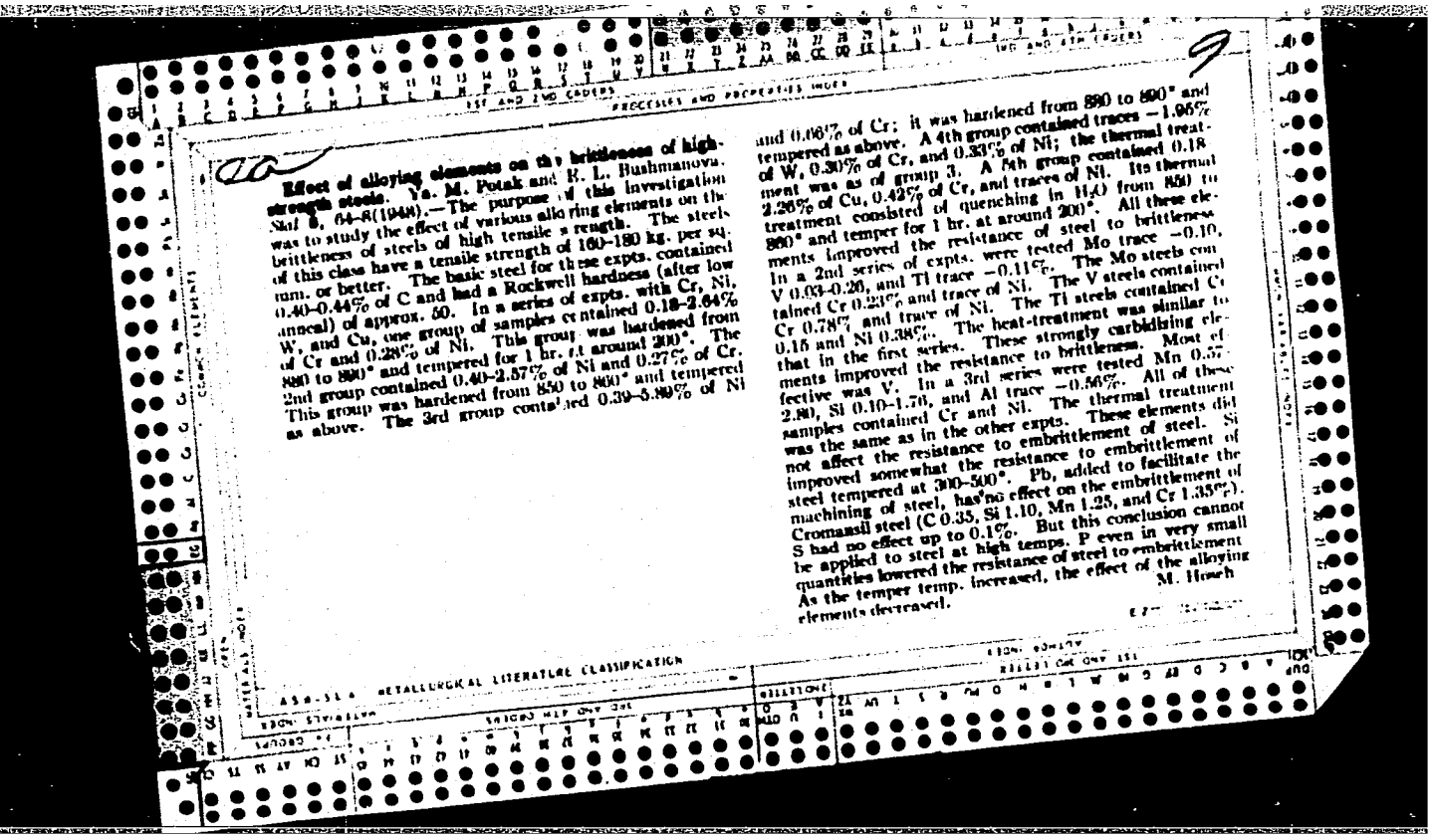
41T96

USSR/Metals (Contd) Jan 1948

additions of nickel, chrome, copper, and tungsten had the greatest effect, while small additions of vanadium, titanium, and molybdenum had somewhat lesser effect.

41T96

POTAK, YA. M.



Effect of alloying elements on the brittleness of high-strength steels. Ya. M. Potak and R. L. Bushmanova. *Stal'* 8, 64–8(1948).—The purpose of this investigation was to study the effect of various alloying elements on the brittleness of steels of high tensile strength. The steels of this class have a tensile strength of 160–180 kg. per sq. mm. or better. The basic steel for these expts. contained 0.40–0.44% of C and had a Rockwell hardness (after low anneal) of approx. 50. In a series of expts. with Cr, Ni, W, and Cu, one group of samples contained 0.18–2.64% of Cr and 0.28% of Ni. This group was hardened from 880 to 890° and tempered for 1 hr. at around 200°. The 2nd group contained 0.40–2.57% of Ni and 0.27% of Cr. This group was hardened from 850 to 860° and tempered as above. The 3rd group contained 0.39–5.89% of Ni and 0.06% of Cr; it was hardened from 880 to 890° and tempered as above. A 4th group contained traces –1.96% of W, 0.30% of Cr, and 0.33% of Ni; the thermal treatment was as of group 3. A 5th group contained 0.18–2.26% of Cu, 0.42% of Cr, and traces of Ni. Its thermal treatment consisted of quenching in H_2O from 850 to 860° and temper for 1 hr. at around 200°. All these elements improved the resistance of steel to brittleness. In a 2nd series of expts. were tested Mo trace –0.10, V 0.03–0.20, and Ti trace –0.11%. The Mo steels contained Cr 0.21% and trace of Ni. The V steels contained Cr 0.78% and trace of Ni. The Ti steels contained Cr 0.15 and Ni 0.38%. The heat-treatment was similar to that in the first series. These strongly carbidising elements improved the resistance to brittleness. Most effective was V. In a 3rd series were tested Mn 0.5–2.80, Si 0.10–1.70, and Al trace –0.56%. All of these samples contained Cr and Ni. The thermal treatment was the same as in the other expts. These elements did not affect the resistance to embrittlement of steel. Si improved somewhat the resistance to embrittlement of steel tempered at 300–500°. Pb, added to facilitate the machining of steel, has no effect on the embrittlement of Cromansil steel (C 0.35, Si 1.10, Mn 1.25, and Cr 1.35%). S had no effect up to 0.1%. But this conclusion cannot be applied to steel at high temps. P even in very small quantities lowered the resistance of steel to embrittlement. As the temper temp. increased, the effect of the alloying elements decreased.

M. Hasch

POTAK, YA. M.

PA 4/49T42

USSR/Engineering
Testing and Standardization
Testing Procedures

Apr 48

"Reply to the Questionnaire," Ya. M. Potak, Acting Supervisor, Lab VIAM, Moscow, 6 pp

"Zavod Lab" Vol XIV, No 4

Discusses relation between composition and mechanical properties of metal. Cites annealing of an 0.77% C steel, where the strength depends on the carbon content of the martensite. Existing methods of testing are not reliable for modern high-tensile steels. Mentions brittle fracture of a 160-180 kg/sq mm steel

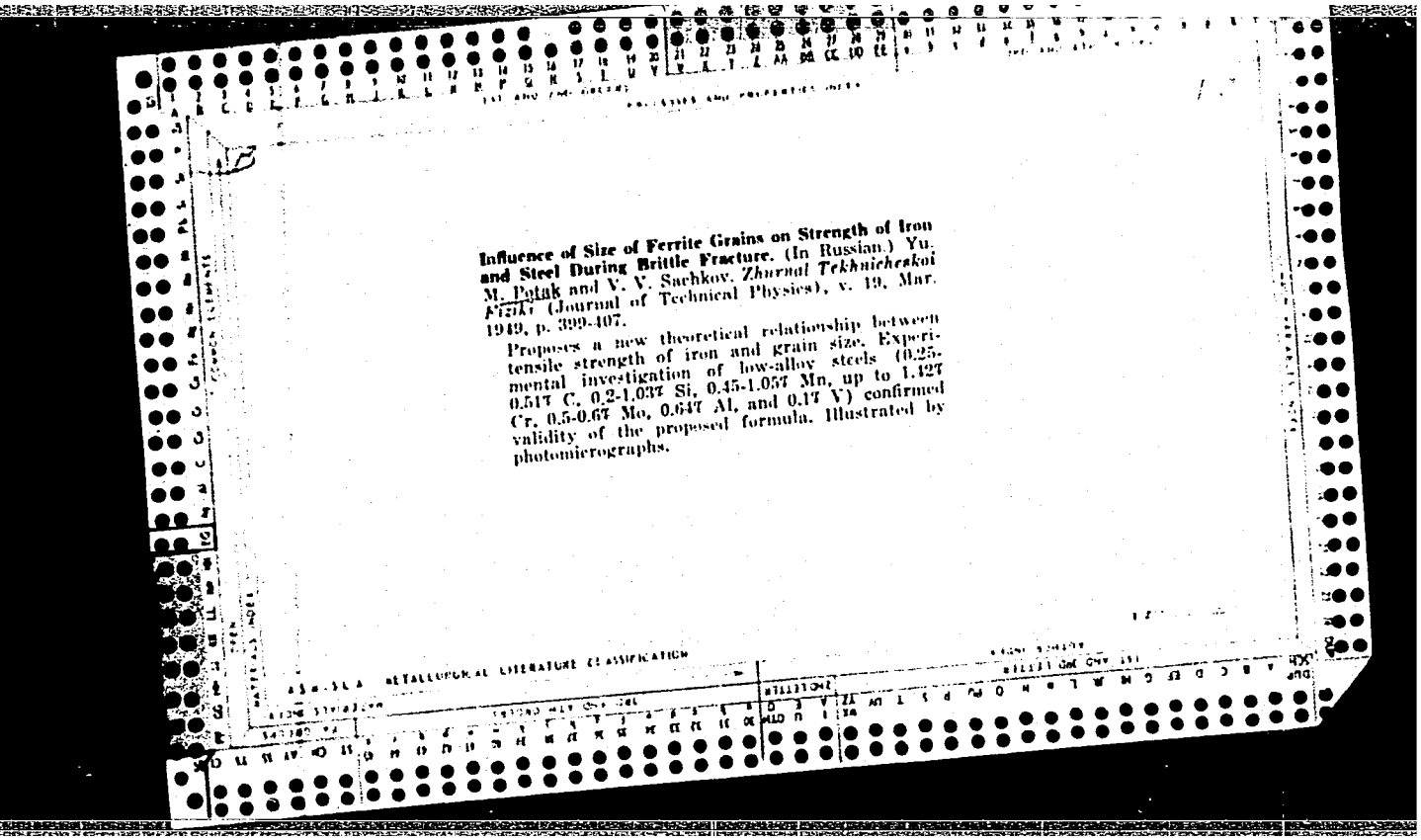
4/49T42

USSR/Engineering (Contd)

Apr 48

Graphs show breaking load versus annealing temperature for grooved high tensile-steel specimens. Discusses measurement of resilience.

4/49T42



Influence of Size of Ferrite Grains on Strength of Iron and Steel During Brittle Fracture. (In Russian.) Yu. M. Potak and V. V. Sachkov. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 399-407.

Proposes a new theoretical relationship between tensile strength of iron and grain size. Experimental investigation of low-alloy steels (0.25-0.51% C, 0.2-1.03% Si, 0.45-1.05% Mn, up to 1.42% Cr, 0.5-0.6% Mo, 0.64% Al, and 0.1% V) confirmed validity of the proposed formula. Illustrated by photomicrographs.

POTAK, YA. M.

MAGAZANIK, S. I., and YA. M. POTAK.

Vliianie termicheskoi obrabotki na soprotivlenie stali otryvu. (Zhurnal tekhnicheskoi fisiki, 1950, v.20, no.11, p.1315-1321, diagrs., bibliography)

Title tr.: Effect of heat treatment on the tensile strength of steel.

QC1.Z48 1950

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

POTAK, Ya. M.

PA 174T40

USSR/Metals - Strength of Alloys Jan 51
Ferroalloys

"Influence of Alloying on the Brittleness of Iron," Ye. L. Bushmanova, Ya. M. Potak, V. V. Sachkov

"Zhur Tekh Fiz" Vol XXI, No 1, pp 26-31

Concludes alloying of iron with nickel, chrome, wolfram, silicon, copper, manganese, cobalt and also contamination of iron with phosphorus do not change the breaking strength in comparison with metals of identical dimensions of the

174T40

USSR/Metals - Strength of Alloys (Contd) Jan 51

ferrite grain. Alloying elements merely influence size of pearlite grains, e.g., nickel makes grains small and phosphorus, large; and size of ferrite grains det brittleness.

174T40

POTAK, Ya. M. FD 368

USSR/Physics - Twinning in Iron

Card 1/1

Author : Sachkov, V. V. and Potak, Ya. M.

Title : On the role of mechanical twinning in brittle failure of iron

Periodical : Zhur, tekh. fiz. 24, 460-466, Mar 1954

Abstract : Using specimens made of Armco iron, disproves generally accepted assumption that mechanical twinning causes brittle failures of cold-short metals. According authors' conclusion twin crystals are formed at the moment of brittle fracturing under effect of high concentration of tangent stresses in the point of rapidly developing crack. Discusses also influence of alloying elements on intensity of twinning. Four references, all USSR; one 1938, others 1948-1953. Photomicrographs, illustrations.

Institution :

Submitted : October 22, 1953

POTAK, Yakov Mikhaylovich; KISHKIN, S.T., laureat Stalinskoy premii, doktor tekhnicheskikh nauk, professor, retsenzent; FRIDMAN, Ya.B., laureat Stalinskoy premii, doktor tekhnicheskikh nauk, professor, retsenzent; ZILOVA, T.K., kandidat tekhnicheskikh nauk, redaktor; SUVOROVA, I.A., redaktor; ZUDAKIN, I.M., tekhnicheskiy redaktor.

[Brittle fracture of steel and steel parts] Khrupkie razrusheniia stali i stal'nykh detalei. Moskva, Gos.izd-vo obor.promysh.,1955. 388 p. (Steel--Brittleness) (MLRA 9:4)

POTAK, YA. M.

"Influence of Molten-Metal Coatings on the Mechanical Properties of Steel and Alloys. Ya. M. Potak and I. M. Shcheglakov (*Zhur. Tekhn. Fiziki*, 1935, 5, (5), 897-907).—[In Russian]. An investigation was made of the phenomenon of premature fracture of steel and a variety of other cold-brittle alloys when in contact with low-m. p. metals. Materials tested were: (1) a Cr steel with coatings of pure Sn, Pb, and Cd, as well as Pb–Sn solders of various compn.; (2) an austenitic steel coated with Sn; (3) a brass with 60% Cu and ~1% Pb, coated with Sn, Hg, and Sn–Pb solder; (4) Cu coated with Pb–Sn and with Hg; (5) a rolled Al alloy contg. ~1·5% Mn coated with Pb–Sn alloy; (6) a cast Al alloy contg. Si ~7 and Mg ~0·3%, coated with Pb–Sn alloy; (7), (8), and (9) Cd, Pb, Zn, resp., all coated with Hg. All coatings were applied after careful cleaning and etching of the surface. Mech. testing took place at room temp. and also at temp. above the m.p. of the coating metals. With Hg coatings, additional tests were performed at −60° C. The results, presented in extensive tables, can be summarized as follows: (a) When tested at temp. slightly above the m.p. of the coatings (1), (3), (6), (9) were considerably weakened by their presence, while the rest were virtually unaffected. Whether a metal is affected depends not only on its crystal structure, but also on its usual mode of fracture (granular or transgranular) and on the magnitude of the elastic stresses produced in testing it. Soft metals in which it is impossible to produce high elastic stresses are insensitive to coating. (b) The sensitive metals are further weakened by testing at still higher temp. (relative to their uncoated strength at these temp.) and austenitic steel (2), which was unaffected at temp. just above the m.p. of its coating becomes severely weakened. The stresses required to produce an effect are reduced with increasing temp. of testing. (c) If, at temp. just above the m.p. of the coating, a metal is weakened by one coating, it will be weakened by all the others. Conversely, if it is insensitive to one, it is insensitive to all. Thus the weakening effect of the liq. coating is not due to a sp. reaction between the two metals. (d) The effect of a solid coating (room- and low-temp. testing) is much less than that of a liq. coating, although in some cases, e.g. high-tensile steel coated with Sn and other metals, the effect is still large. Hard-metal coatings have only the effect of facilitating the formation of the first surface cracks; thereafter the cracks spread exactly as in uncoated specimens. (e) The hypothesis that the weakening effect on steel is due to diffusion into the lattice of low-m.p. coatings at temp. <370° C. has not been confirmed by experiment. (f) The most probable explanation is that the phenomenon is a physico-mech. surface effect; the coatings assist crack advance and lower the surface energy.—A. F. B.

POTAK, Ya. M.

Influence of several processes of heat-treatment on the tendency to delayed fracture of steels with tensile strengths of 120–140 kg./sq. mm. L. M. Pevzner, V. E. Sadovskii, T. K. Zilova, S. S. Volkov, and Ya. M. Potak. *Metalloved. i Obrabotka Metallov* 1956, No. 3, [illegible] Exptl. study was made of the effect of stress and H on delayed fracture in steel 30KhGSA (0.3% C, 1.0 Mn, 1.0 Si, 1.0 Cr, 0.4 Ni). Plates 2 × 8 × 10 mm. were bent various amts. in the elastic or elastoplastic range and were made the cathode in a 5% $NaHSO_4$ soln. for 30 min. The max. amt. of bending for which no cracking occurred was tabulated. Hardness in the range 37–40 R_c was produced by a variety of heat-treatments. The surface layer was important in detg. the exptl. behavior. For specimens that had been given the same hardening treatment, tempering in a nondeoxidized salt bath gave a value of more than 6 mm. of bending while tempering in a muffle furnace gave about 2 mm. Fresh salt baths also gave about 2 mm., although well used, deoxidized baths gave values comparable to nondeoxidized baths. The fresh baths produced a surface layer contg. 0.0271 g. N compared to 0.0014 for used baths. When the fresh bath was used at 410° it gave more than 6 mm. of bend because the nitriding process was almost absent. Heating in a muffle furnace, either for hardening or for tempering, gave a low bend value because of the oxide layer produced. Isothermal quenching in salt baths at 390–410° gave the best results. There was considerable variation among heats of steel. Polishing the surface after heat-treatment lowered the bend value in many cases; for isothermal quenching the lowering was from more than 6 mm. down to 2. The above

POTAK, YA. M.

Category : USSR/Solid State Physics - Mechanical properties of crystals and polycrystalline compounds E-9

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1371

Author : Potak, Ya.M.
Title : Laboratory Methods of Estimating the Tendency of Steel To Brittle Failure

Orig Pub : Zavod. laboratoriya, 1956, 22, No 2, 208-217

Abstract : The experimentally observed brittle failures of various steels are classified by the author to the following basic types: (a) failure by tearing; (b) failure starting with shear and transforming into failure by tearing; (c) failure of steels in a stressed state under the influence of surface-active or corrosive means. Steels having a tendency to one type of brittle failure are hardly subject to failure by other types. It is therefore proposed in the investigation of brittle failure of steels to distinguish between the fundamental types of brittle failure, and to select accordingly, for each type of failure, the mosr reliable test procedure. The use of universal methods for estimating the tendency of steel to brittle failure leads to results that cannot be compared with each other.

Card : 1/1

POTAK, YA. M.

24(6) PHASE I BOOK EXPLOITATION SOV/2385

Akademiya nauk SSSR

Nekotoryye problemy prochnosti tverdogo tela; sbornik statey (Some Problems in the Strength of Solids; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 386 p. Errata slip inserted. 2,000 copies printed.

Ed. of Publishing House: V. I. Aver'yanov; Tech. Ed.: R. S. Pevzner; Editorial Board: A.F. Ioffe, Academician; G. V. Kurdyumov, Academician; S. N. Zhurkov, Corresponding Member, USSR Academy of Sciences; B. P. Konstantinov, Corresponding Member, USSR Academy of Sciences; F. F. Vitman, Doctor of Physical and Mathematical Sciences, Professor (Resp. Ed.); L. A. Glikman, Doctor of Technical Sciences, Professor; N. A. Zlatin, Doctor of Physical and Mathematical Sciences; V. A. Stepanov, Doctor of Technical Sciences; Ya.B. Fridman, Doctor of Technical Sciences, Professor; B. S. Ioffe, Candidate of Technical Sciences (Deputy Resp. Ed.).

PURPOSE: This book is intended for construction engineers, technologists, physicists and other persons interested in the strength of materials.

COVERAGE: This collection of articles was compiled by the Otdeleniye fiziko-matematicheskikh nauk AN SSSR (Department of Physical and Mathematical Sciences) and the Fiziko-tekhnicheskiy institut AN SSSR (Institute of Applied Physics, Academy of Sciences, USSR) in commemoration of the 80th birthday of Nikolay Nikolayevich Davidenkov, Member of the Ukranian Academy of Sciences, founder and head of the Otdel prochnosti materialov (Department of the Strength of Materials) at the Institute of Applied Physics, Academy of Sciences, USSR, founder of the Fakul'tet fizicheskogo metallovedeniya (Department of Physical Metallurgy) at the Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute), recipient of the Stalin Prize (1943), the Order of the Red Banner of Labor (1945) and the Order of Lenin (1953). The articles deal with the strength of materials, phenomena of imperfect elasticity, temper brittleness, hydrogen embrittlement, cold brittleness, influence of deformation speed on the mechanical properties of materials, fatigue of metals, and general problems of the strength, plasticity, and mechanical properties of nonmetals. Numerous personalities are mentioned in the introductory profile of Professor Davidenkov. References are given at the end of each article.

Card 7/10

SOV/129-59-1-4/17

AUTHORS: Gulyayev, A.P., Doctor of Technical Sciences, Professor, Lepnev, S.V., Engineer and Potak, Ya.M., Candidate of Technical Sciences

TITLE: High-strength Austenitic Steels (Austenitnyye stali vysokoy prochnosti)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 1, pp 10 - 15 (USSR)

ABSTRACT: Investigation of the stainless steels EI904 and EI925 has shown that if the martensitic point is at room temperature, even if the carbon content is 0.05 - 0.10%, it is possible to arrive at a high strength (90 - 130 kg/mm^2) combined with a high ductility and impact strength. The authors of this paper have attempted to verify on a series of high-nickel content steels the earlier expressed assumption that optimum mechanical properties are achieved if the test temperature corresponds with the temperature of the martensitic point (Author's Certificate dated March 25, 1957, Nr 110052). The experiments were carried out on two series of heats, one with a carbon content of 0.26% and nickel contents of 20.9, 23, 23.3, 24.3, 25.6 and 28%, the other with a carbon content of 0.41% and nickel contents of 16.8, 18.4, 20.9, 21, 22.8 and 23.6%.

Card1/3

The contents of the usually present admixtures were 0.57 - 0.59% Mn, 0.30% Si, 0.019 - 0.020% S and 0.015 - 0.08% P.(The experimental part of this work was carried out with the participation of Ye.V. Yegorov). The specimens for tensile and impact tests were produced from forged rods which were hardened from 1 100 °C and cooled in air and, following that, were tested at room temperature. The mechanical properties of the experimental alloys as a function of the nickel content are graphed in Figure 2. The authors summarise their conclusions as follows: 1) steels of the transient class possess a particular combination of mechanical properties which are not encountered in steels of other types. These steels can have low yield points (20 - 40 kg/mm^2) combined with high ultimate strength values (100 - 200 kg/mm^2). The mechanical properties of these steels depend predominantly on the ability of austenite to change into martensite during deformation and also on the resistance to fracture of the martensite which forms during the tests. If hardening martensite is present in the initial structure, its strength also determines the mechanical properties of the steel; 2) tensile tests of nickel steels of the

High-strength Austenite Steels SOV/129-59-1-4/17

which
transient class/contain 0.26% C with an initially pure austenitic structure, revealed that such steels have a high plastic deformation (elongation up to 60%); the fracture takes place without necking, whereby the value of the relative elongation is larger than that of the relative transverse contraction. It was confirmed that for steels with unstable austenite, it is possible to obtain a combination of strength and ductility which apparently cannot be achieved for steels of other types of structure. There are 2 figures, 1 table and 4 references, 2 of which are Soviet, 1 American and 1 German.

Card 3/3

SOV/129-59-6-13/15

AUTHORS: Potak, Ya. M., Candidate of Technical Sciences and Medvedeva, K. S., Engineer

TITLE: Brittle Fracture of Steel Components Heated in Salt Baths, Deoxidized with Potassium Ferrocyanide (Khrupkoye razrusheniye stal'nykh detaley, nagretykh v solyanykh vannakh, raskislennykh zheltoy krovyanoy sol'yu)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1959, Nr 6, pp 59-61 + 1 plate (USSR)

ABSTRACT: The authors carried out experiments with steels 30KhGSA from two heats and also with steel 30KhGSNA from two heats. The changes in the state of the metal as a result of using various methods of deoxidation of the salt bath were evaluated by means of the hydrogen test. Specimens of 2 x 8 x 10 mm were subjected to the effect of hydrogen for 30 mins in the elastically-bent state at the cathode, inside an electrolyte consisting of a 5% aqueous solution of $NaHSO_4 \cdot H_2O$, using a current density of 0.5 A/dm^2. As a criterion of the surface quality of the steel, the magnitude of bending was used which the specimen could withstand without failure. The

Card1/4

Brittle Fracture of Steel Components Heated in Salt Baths, Deoxidized with Potassium Ferrocyanide

specimens were heated to 900°C in salt baths deoxidized by various substances and then were quenched in oil and tempered: the specimens of 30KhGSA steel were tempered in a chamber furnace for 40 to 50 mins at 520 to 530°C, the steel 30KhGSNA was also tempered in a chamber furnace for 2 1/2 hours at 250 to 260°C. The specimens were subjected to the hydrogen test after heat treatment without any additional treatment of the surface. The metallographic analysis of the layer was carried out on polished sections cut obliquely at an angle of 3°. During deoxidation the quantity of potassium ferrocyanide was varied between 0 and 2%. In some cases the bath was deoxidized with charcoal prior to adding potassium ferrocyanide. On the basis of the obtained results the following conclusions are arrived at:

1. Heating of steel components in baths deoxidized with potassium ferrocyanide leads to the formation on the surface of a thin, hard and brittle layer which brings about premature failure.

2. Due to increasing brittleness of the surface layer

Brittle Fracture of Steel Components Heated in Salt Baths, Deoxidized with Potassium Ferrocyanide

with increasing heating time in the bath and with increasing concentration of the potassium ferrocyanide, the component becomes more susceptible to failure. For salt concentrations of about 2% a layer about 100 μ deep will form at the surface even for heating times of only 8 mins.

3. Heating of the specimens in a salt bath deoxidized with $K_4Fe(CN)_6$ leads to the formation of a network along the austenitic grains; this network is located either at the very surface or at a certain depth from the surface.

4. Heating in a salt bath for 7 to 8 mins leads to a relatively slight saturation of the surface layer with carbon. If the component is left in the salt bath for three hours, the carbon content of the surface layer is reduced. As a result of the heating in the bath, the surface layer is saturated to a considerable extent with nitrogen. The nitrogen content increases with increasing concentration of the potassium ferrocyanide and

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increasing duration of the heating time.
5. The author considers that it is inadmissible to deoxidize by means of potassium ferrocyanide baths intended for heating constructional steel components which are to be quenched and loaded with high stresses.
There are 4 figures, 1 table and 2 Soviet references.

09333

S/129/60/000/05/007/023
E193/E283

18.1130

AUTHORS: Potak, Ya. M., Candidate of Technical Sciences, and Sachkov, V. V., and Popova, L. S., Engineers

TITLE: High Strength Stainless Steels of the Intermediate Austenitic-Martensitic Type

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, Nr 5, pp 24-30 (USSR)

ABSTRACT: New types of stainless steels, characterized by an intermediate austenitic-martensitic structure, have been developed recently in the USA (steels 17-7RN, AM350, AM355, 17-7Mo) and Gt Britain (steel FV-520). Similar steels have been developed in the USSR and the properties of two steels of this type (SN2 and SN3) are discussed in the present article. The chemical composition of these steels is given in Table 1. The relative position of these steels in the system of austenitic and martensitic steels is illustrated schematically in Fig 1, where the 0.2% proof stress ($\sigma_{0,2}$, kg/mm^2) is plotted against the alloying elements content (increasing C, N, Ni, Cr, Mo, and decreasing Al); the three curves relate to material subjected to the following heat treatments: 1 - quenching; 2 - quenching and sub-zero treatment; 3 - quenching, sub-zero

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High Strength Stainless Steels of the Intermediate Austenitic-Martensitic Type

treatment, and tempering; the figures given by the curves indicate the approximate values of $\sigma_{0.2}$; the intermediate steels are in the shaded region, the martensitic and austenitic regions being to the left and right respectively. The intermediate steels have certain specific properties. In the water- or air-quenched condition they have mainly austenitic structure, characterized by low hardness and yield point on one side, and high ductility and toughness on the other. In comparison with the austenitic steels, steels of the intermediate type have relatively high UTS, owing to the fact that, as a result of plastic deformation, martensitic transformation takes place in the tensile test pieces. Intensive formation of martensite takes place during the sub-zero treatment. This leads to an increase in UTS and particularly in the yield point; since, however, a considerable proportion of austenite is retained after this treatment, the obtained material

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is both strong and ductile. The martensitic transformation takes place also during plastic deformation (rolling, drawing, forming, etc) of the intermediate steels; the intensity of the transformation depends on the temperature; at temperatures higher than N_d, the martensitic transformation does not occur. With increasing content of alloying elements that lower the temperature of the martensitic transformation (C, N, Ni, Cr, Mo, Mn), the character of steel changes from martensitic to austenitic. This is illustrated by data reproduced in Fig 2, where the mechanical properties, σ_b (UTS kg/mm^2) and $\sigma_{0.2}$ (0.2% proof stress, kg/mm^2) of steel SN2, are plotted against the nickel content (the content of other alloying additions is given in the caption); the curves were constructed for specimens subjected to the following heat treatments: 1 - quenching from 1050°C; 2 - quenching from 1050°C, 2 h treatment at -70°C; 3 - as in (2) and then tempered at 500°C for 1 h; 4 - quenching from 760°C and tempering for 1 h at 500°C. It will be seen

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that steels, containing 6.68 to 7.4% Ni, are martensitic, those with 8.76 to 9.57% Ni are austenitic; of course, the proportion of nickel, necessary to impart to a steel the intermediate properties, may change for a material with a different content of other alloying additions. The effect of titanium and aluminium content on the mechanical properties of steels containing 0.05% C, 0.3% Si, 0.7% Mn, 16.0% Cr, and 6.8% Ni in the former case, and 0.06% C, 0.25% Si, 0.82% Mn, 16.1% Cr, and 6.6% Ni, in the latter case, is illustrated in Fig 3, where $\sigma_{0.2}$ and σ_b are plotted against the Ti (graph a) and Al (graph b) content (%); curves 1 and 2 relate to steels 1 - quenched from 1050°C and 2 - quenched from 1050°C and tempered at 500°C for 1 h. It will be seen that increasing the content of aluminium, which raises the martensitic point of steels, results in changing the steel structure to martensitic, and accelerates

Card 4/12 the tempering tension. Introduction of titanium, which

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forms carbides that are not easily soluble, decreases the carbon content in austenite and so raises the martensitic point; the rate of tempering is also accelerated by addition of titanium. Steels with certain alloying elements may contain delta-ferrite, in which case the limits of the alloying elements content within which a steel will retain its intermediate character, become wider. This is illustrated by comparing curves in Fig 2 (for steel SN2, not containing delta-ferrite) with those given in Fig 4 (for steel SN3 which contains 20 to 25% delta-ferrite), where σ_b and $\sigma_{0.2}$ are plotted against the Ni (graph a) and Mo (graph b) content, the content of other alloying elements being given in the caption; curves 1 and 2 relate to material 1 - quenched from 1050°C and 2 - quenched from 1050°C, treated at -70°C for 2 h, and tempered at 450°C. It has been found that, in the presence of delta-ferrite, the content of not only nickel, but also molybdenum and carbon in the steel can be considerably varied without affecting

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its intermediate character; no plausible explanation of this effect has yet been found. The position of the martensitic point of steels of the intermediate type can be appreciably changed by varying the quenching temperature, as a result of which the position of austenite changes owing to dissolution or precipitation of carbides. This is illustrated by data, reproduced in Fig 5, where σ_b and $\sigma_{0.2}$ of an experimental steel containing 0.11% C, 15.0% Cr, 8.2% Ni, 0.6% Ti, 0.26% Al (graph a) and steel SN3, containing 0.09% C, 16.9% Cr, 4.8% Ni, 3.25% Mo, 0.51% Mn (graph b) are plotted against the quenching temperature (°C); the various curves relate to material 1 - as quenched, and 2 - quenched, treated at -70°C for 2 h, and tempered at 500°C (graph a) or 450°C (graph b). It will be seen that although the intermediate steel SN3, containing 17% Cr and 3.5% Mo, has a very high strength after air-quenching from 950°C, followed by sub-zero treatment,

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some melts of this steel did not harden when quenched from temperatures higher than 1050°C. This is explained by the fact that after the chromium and molybdenum carbides have been dissolved, austenite becomes so stable that no martensitic transformation occurs during the sub-zero treatment. Titanium-bearing steels may change from martensitic to intermediate type if the quenching temperature is raised to 1050°C (Fig 5), so as to dissolve titanium-bearing carbides; further increase in the quenching temperature leads to the formation of almost fully austenitic structure and brings about a decrease in the yield point and a slight increase in the UTS. Strength of steels of the intermediate type increase considerably during plastic deformation, the increase in the yield point being more rapid than that in the UTS. This is illustrated by data, reproduced in Fig 6, where $\sigma_{0.2}$ and σ_b (kg/mm^2, left-hand scale), proportion of martensite α, and elongation δ (%, right-hand scale), are plotted against the degree (%) of

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plastic deformation by cold rolling; the curves, constructed for steel SN2, relate to material 1 - after deformation, and 2 - after deformation followed by tempering for 1 h at 480°C. It is pointed out, in this connection that whereas tempering of cold-worked steel increases its UTS only in the case of a high degree of deformation, the yield point increases even in lightly deformed material. Not only strength, but also elongation of cold-worked, intermediate steels, is increased by tempering; a decrease in ductility after tempering is observed only in heavily deformed steels of this type. The optimum results are obtained by tempering at 450 to 500°C; this is shown in Fig 7, where α (%)m $\sigma_{0.2}$ σ_b, and δ of steel SN2 are plotted against the tempering temperature for material tempered for 1 h after cold deformation (graph a) and after quenching, followed by a 2 h treatment at -70°C (graph b). The sub-zero treatment as a method of increasing strength of

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steels, was first suggested in USSR by Gulyayev (Ref 6); beside cold-working, this treatment is one of the basic methods of hardening steels of the intermediate type. The effectiveness of this treatment depends largely on whether the given steel is more austenitic or martensitic in character, and on the extent to which carbides are dissolved in austenite. This is illustrated by data, reproduced in Fig 8, where the left-hand graph shows the variation of $\sigma_{0.2}$ as a function of the temperature of the sub-zero treatment of 2 h duration, the right-hand graph showing the variation of $\sigma_{0.2}$ as a function of time (10, 30 min, 1, 2 h) at -70°C; curves 1 to 4 relate to steel containing 8.76%, 7.35%, 7.75% and 7.4% Ni, respectively. The sub-zero treatment yields optimum results when carried out at -70°C, its effectiveness decreasing at lower temperatures. The martensitic transformation during the sub-zero treatment takes place isothermally; the rate of transformation during the first 1 to 2 h can be slowed down by preliminary

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stabilizing treatment which can be carried out by one of four different methods: (1) heating to 150 to 550°C; (2) cold deformation of 1 to 10% (the lower the degree of deformation the better); (3) slow cooling to the temperature of the sub-zero treatment; (4) cooling the steel to -30°C before subjecting it to the sub-zero treatment proper. Steels SN2 and SN3 can be fabricated in the form of soft, half-hard, and hard strip and sheet, as well as in the form of rods, forgings, wires and extruded sections. Steel SN2 should not be hot-worked above 1200°C; owing to the possibility of the presence of some delta-ferrite in steel SN3, its maximum hot-working temperature is about 1050°C; the lower limit of the hot working range for both steels is 800°C. Typical mechanical properties of steels SN2 and SN3 are given in Table 2 under the following headings: type of the product [rods; plates (strip); rod; plate (strip); ditto]; condition and heat treatment

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(quenching from 1050°C; ditto quenching from 975°C, SN2, or 930°C, SN3, followed by 2 h treatment at -70°C and tempering at 425°C, SN2, or 450°C SN3; ditto, but steel SN2 quenched from 950°C; cold-rolled, half-hard; ditto followed by tempering); σ_b, $\sigma_{0.2}$, δ, impact strength a_k, kgm/cm^2, of steel SN2 and SN3. Owing to its high Cr (17%) and Mo (3%) contents, and the presence of delta-ferrite, steel SN3 is more corrosion-resistant than steel SN2. Both steels can be easily welded, steel SN3 being used in both cases as the welding rod; no heat treatment after welding is necessary. The article is concluded by a list of several recommended heat treatment procedures for steels SN2 and SN3. (1) To improve machineability: heating to 750°C, cooling to 20°C, and re-heating to 650°C; the structure produced by this treatment consists of martensite with some residual austenite and carbides, precipitated at the grain boundaries. (2) Quenching, preliminary to the sub-zero treatment: rods and forgings of steel SN2 are quenched

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from 975°C, sheet from 950°C; steel SN3 is quenched from 930°C. To obtain maximum ductility, the quenching temperature can be raised to 1050°C; in this case a second quenching operation from 950 to 975°C (steel SN2) or 930°C (steel SN3) is required prior to the sub-zero treatment. (3) The sub-zero treatment consists of 2 h at -70°C or 4 h at -50°C. (4) Depending on the required yield point, steel SN2 is tempered at 350 to 500°C, steel SN3 at 450°C. There are 8 figures, 2 tables and 6 references, 5 of which are English and 1 Soviet.

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18.7100
18.1130

AUTHORS: Kubyshkina, T.D. (Engineer); and Pevzner, L.M. and Potak, Ya.M. (Candidates of Technical Sciences)

TITLE: Martensitic Transformation in Austenite-Martensite Class Steels

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, No 8, pp 9-17

S/129/60/000/08/003/009
E073/E135
81876

TEXT: The work described in this paper was devoted to studying the kinetics of the martensitic transformation during cooling and isothermal heating. The investigations were carried out on steel Kh15N9Yu1 (composition 0.07% C, 15% Cr, 8.5% Ni, 1% Al). The results of this paper relate to heats for which the quantity of martensite after quenching with cooling to room temperature did not exceed 1-4%. The kinetics of martensite transformation were investigated magnetically by means of an improved anisometer. The martensite quantity was determined by measuring the magnetic saturation in strong fields using a ballistic method. In addition to that, a method described by Auerbach and Cohen (Ref 4) was also used for some of the specimens. Furthermore optical, electron metallography studies and separation of the anodic precipitate followed by chemical and X-ray analysis (Ref 6) were also applied. The influence of the

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E073/E135

Martensitic Transformation in Austenite-Martensite Class Steels

heating temperature on the quantity of martensite in the case of quenching to +20 °C and to -70 °C is plotted in Fig 1. The quantity of martensite was determined after cooling from 1050 °C down to room temperature in air (point II) and subsequent soaking at -70 °C for 2 hours (point I). After quenching from 1050 °C a series of specimens were subjected to reheating at temperatures between 20 and 1050 °C for a duration of one hour and then cooled in air down to 20 °C and the quantity of martensite was determined (curve 1); following that, cold treatment was applied at -70 °C for 2 hours with subsequent heating to room temperature, and the quantity of martensite was measured again (curve 2). It was established that heating to 525-950 °C after austenisation at 1050 °C leads to an appreciable decrease in the austenite stability. Destabilization of the austenite is attributed to the fact that the solid solution combines with chromium and carbon due to rejection of chromium carbide. Long-duration storage at room temperature after austenisation, and also heating to temperatures up to 500 °C, lead to stabilization of the austenite.

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S/129/60/000/08/003/009
E073/E135

Martensitic Transformation in Austenite-Martensite Class Steels

Martensite transformation after thermal stabilization has the following characteristic features: super-cooling of austenite can be achieved without transformation down to any temperature (down to -196 °C) at relatively low cooling speeds; austenite to martensite transformation proceeds isothermally after a certain incubation period. The dependence of the speed of transformation on the temperature of the isotherm and also on the duration of the isothermal holding can be expressed by a curve which shows a maximum (Fig 3). These relations do not extend to ordinary martensitic transformations of unstabilized austenite. After thermal stabilization relations of the martensitic transformation were detected which indicate that in this case the kinetics of transformation are determined by the thermal oscillations of the atoms. The thermal stabilization is linked with changes in the fine structure of the lattice, the nature of which is not clear. It is possible that there is a relaxation of stress peaks in small sections or that there is an annihilation of particular sections of the lattice which are prepared for transformation.
There are 8 figures and 19 references: 10 Soviet, 8 English and 1 German.

Card 3/3

18 7500

S/180/61/000/004/006/020
28868
E111/E330

AUTHORS: Belyako..., I.N., ...mbits, S.G. and Potak, Ya.M. (Moscow)

TITLE: The role of delta-ferrite in the martensite transformation of stainless steels

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo. no. 4, 1961, pp. 53 - 55

TEXT: The presence of delta-ferrite in stainless steels has, in some cases, an important effect on the martensite transformation, shifting it towards higher temperatures (Ref. 1 - E.J. Zapffe, C.I. Llewellyn, F.E. Pickering - J. Iron and Steel Inst., 1959, v. 192, No. 3 (Problemy sovremennoy metallurgii, 1960, No. 1)) but, in other instances, the effect is absent. The present investigation aimed at elucidating this problem. Steels from three heats were used; each heat was teemed in 5-10 batches. Individual batches differed in the cobalt or aluminium content. The delta ferrite was isolated from one heat (0.058% C, 0.58 Mn, 0.28 Si, 18.50 Cr, 7.60 Ni,

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The role of delta-ferrite ....

content. The experiments showed that in the absence of carbides, small quantities of delta-ferrite lead either to a slight increase in the martensite-point temperature or to a decrease smaller than calculated. Further experiments are needed to elucidate this effect. Delta-ferrite leads to a considerable increase in transformation temperature after heating that results in carbide formation. This is explained by a more intensive separation of the carbide phase at the delta-ferrite/austenite boundaries compared with that at austenite/austenite boundaries. There are 2 figures, 3 tables and 7 references: 2 Soviet-bloc and 5 non-Soviet-bloc. The four latest English-language references quoted are: Ref. 1 - quoted in text: Ref. 2 - F.C. Monkman, F.B. Cuff and N.J. Grant - Metal Progr., 1957, v. 71, no. 4; Ref. 3 - H.T. Shirley - J. Iron and Steel Inst., 1957, v. 174, no. 3; Ref. 5 - H.C. Vacher, C.J. Bechtoldt - J. Res. Nat. Bur. Standards, 1954, v. 53, no. 2.

SUBMITTED: February 27, 1961

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| 1710 [illegible], 1963, 1454

22545
S/129/61/000/005/001/003
E111/E152

AUTHORS: Potak, Ya.M., Candidate of Technical Sciences,
Orzhekhovskiy, Yu.F., Candidate of Technical Sciences,
Pevzner, L.M., Candidate of Technical Sciences,
Roshchina, I.N., Engineer, and
Yermakov, V.N., Engineer.

TITLE: Thermal-mechanical treatment of steel to give high strength

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No.5, pp. 2-9

TEXT: The authors point out that recently much attention has been given to combined mechanical and head treatment, by two possible methods. In one method the steel is rapidly deformed in the austenite-stable temperature range and quenched. While this improves the steel in many ways it fails to increase tensile strength. In the second method the steel is deformed at a temperature between the martensite point M_d and the recrystallization temperature, and quenched. This gives increased strength with satisfactory plasticity. Results of thermal-mechanical

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Thermal-mechanical treatment of steel to give high strength

treatment are not universally successful, and there are no reliable data on the practical use of the "ausform" or "ausforming" treatment widely advertised in the USA. The object of the present work was the study of thermal-mechanical treatment of alloy structural steels to a high strength and the structure produced by the treatment. The composition of the steels was as shown in Table 1, steels A-Г being melted in induction and Д and E in arc furnaces: the first group were austenitized at 1000, the second at 900 °C. After cooling in a nitrate bath to the deformation temperature the steels were rolled in 4-5 passes (reduction 90%), oil-quenched and tempered. To reduce cooling the work was reheated between passes and other measures taken, e.g. rolls were preheated to 100 °C. A portable magnetic instrument (developed by G.Yu. Sila-Novitskiy and T.D. Kubyshkina) was used to detect isothermal-decomposition products: if found, the specimen was rejected. After treatment specimens had a hardness R_c of 58-64 and mechanical-test pieces were prepared by spark machining and removal by grinding (temperature kept below 100 °C)

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Thermal-mechanical treatment of steel to give high strength

C content due to semi-brittle or brittle fracture. The best strength/plasticity combination was obtained with tempering at 100 °C. In some experiments on steel 5 the deformation was decreased to 50%; the results were less favourable than with the 90% deformation as regards strength, but gave high plasticity. The advantage of 50% deformation is that it can be effected at relatively high temperatures, even above the recrystallization temperature. Bend tests on 60 x 10 x 2 mm plates of steel 5 heated in various ways were also carried out. Electron-microscopic study of the fine structure of thermomechanically treated steel A showed a pronounced texture and considerable refinement of martensite plates. X-ray diffraction by rotating specimens was also studied (with a УРС-50И (URS-50I) ionization apparatus with automatic recording of intensity distribution in $Fe k_{\alpha}$ radiation); block size of the thermomechanically treated steel was one half to one quarter that obtained with ordinary hardening. The authors conclude that structure refinement is one factor in the effectiveness of the treatment.

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S/129/61/000/011/005/010
E071/E335

AUTHORS: Sachkov, V.V., Lavrov, V.I., Engineers and Potak, Ya.M., Candidate of Technical Sciences

TITLE: Steel Х17Н4АГ9 (ЭИ878) (Kh17N4AG9(EI878) as a substitute for steels of the type 1Х18Н9 (1Kh18N9) and 1Х18Н9Т (1Kh18N9T)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 11, 1961, 30 - 33

TEXT: EI-878(Kh17N4AG9) austenitic stainless steel (0.12% max C, 0.7 max Si, 8-10.5 Mn, 16-18 Cr, 3.5-4.5 Ni, 0.15-0.25 N, 0.020% max S and 0.03% max P) was developed a few years ago as a substitute for 18-8 type steels. In order to increase nitrogen solubility and prevent ingot growth it has a higher Mn content than AISI 201 steel. The structure of this steel remains fully austenitic; even after heating to 1 250 °C no formation of δ-ferrite at high temperatures or martensite at low temperatures was observed. The amount of α-phase formed by cold-working with reductions as high as 40% does not exceed 4%. The steel has good technological properties; its mechanical properties

Card 1/2

POTAK, I. M.[Potak, Ya.M.]; ORJEHOVSKI, I. F.[Orzhekhovskiy, Yu. F.]; PEVZNER, L. M.; ROSCINA, I. N.[Roshchina, I. N.]; ERMAKOV, V.N. [Yermakov, V. N.]

Thermomechanical treatment of steel for the obtainment of a high mechanical resistance. Analele metalurgie 15 no.4:114-123 O-D '61.

(Steel—Heat treatment)

MALINKINA, Ye.I., kand. tekhn. nauk; GOLUBYATNIKOV, V.A., kand. tekhn. nauk, retsenzent; POTAK, Ya.M., doktor tekhn. nauk, red.

[Crack formation during the heat treatment of steel parts] Obrazovanie treshchin pri termicheskoi obrabotke stal'nykh izdelii. Izd.2., perer. i dop. Moskva, Mashinostroenie, 1965. 174 p. (MIRA 18:2)

RAKHSHTADT, Aleksandr Grigor'yevich; POTAK, Ya.M., prof., doktor tekhn. nauk, retsenzent

[Alloys for springs; their properties and heat treatment] Pruzhinnye splavy; svoistva i termicheskaia obrabotka. Moskva, Metallurgiia, 1965. 362 p. (MIRA 18:11)

L 09946-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6035725 SOURCE CODE: UR/0413/66/000/019/0085/0085

29

INVENTOR: Chugunov, V. V.; Orzhekhovskiy, Yu. F.; Potak, Ya. M.

ORG: none

TITLE: Stainless steel. Class 40, No. 186701

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 19, 1966, 85

TOPIC TAGS: stainless steel, ~~chromium~~ nickel steel, molybdenum ~~containing~~ steel, tungsten ~~containing~~ steel, vanadium ~~containing~~ steel, niobium ~~containing~~ steel

Chromium steel

ABSTRACT: This Author Certificate introduces a chromium stainless steel containing tungsten, vanadium and niobium. To improve the mechanical properties, the steel composition is set as follows (%): 0.04—0.08 carbon, 1.0 max manganese, 1.0 max silicon, 10.5—12.0 chromium, 0.6—0.8 molybdenum, 0.9—1.3 tungsten, 0.2—0.3 vanadium, 0.08—0.15 niobium, and 2.5—3.5 nickel

SUB CODE: 11/ SUBM DATE: 30Nov64/ ATD PRESS: 5105

Card 1/1 UDC: 669.14.018.8

L 28445-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) MJW/JD
ACC NR: AP6016587 (A, N) SOURCE CODE: UR/0129/66/000/005/0023/0025

AUTHOR: Kozlovskaya, V. I.; Potak, Ya. M.; Orzhekhovskiy, Yu. F.; Birman, S. I.

ORG: none

TITLE: Improving the notch toughness and ductility of martensitic stainless steel at -196C by means of reverse martensite transformation

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 5, 1966, 23-25

TOPIC TAGS: stainless steel, precipitation hardenable steel, martensitic steel, steel transformation, martensitic transformation, reversed transformation, steel mechanical property/08Kh15N5D2T steel

ABSTRACT: The possibility of using 08Kh15N5D2T (EP-410) precipitation-hardenable martensitic stainless steel (0.07%C, 15%Cr, 4.96%Ni, 1.96%Cu, and 0.18%Ti) for operation at subzero temperatures has been studied. At -196C, conventionally heat treated (annealed at 950C, quenched, and aged at 350—550C) steel has a very low notch toughness of 1 mkg/cm^2. To increase the notch toughness and ductility, reverse martensitic transformation was utilized to promote the formation of stable austenite. It was found that stable austenite is formed by annealing at 950C, air cooling, and subsequent aging at 575—625C for 3 hr. After this treatment, the steel contained 20—25% austenite which remained stable on cooling to -196C and considerably improved the characteristics of ductility. After aging at 600C, the respective

Card 1/2 UDC: 669.14.018.84:620.178.2

L 28445-66

ACC NR: AP6016587

mechanical properties at +20 and -196C were: tensile strength 90 and 140 kg/mm^2, yield strength 78 and 110 kg/mm^2, elongation 20 and 26%, and notch toughness 16 and 8 kgm/cm^2. Cyclic aging at 650—750C with 15 min cycles brought about a transformation-induced strain hardening and increased the notch toughness to 9 kgm/cm^2. Orig. art. has: 4 figures and 2 tables. [AZ]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 006/ ATD PRESS: 5007

Card 2/2

L 15211-66 EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(h) JD/HW

ACC NR: AP6002910 SOURCE CODE: UR/0286/65/000/024/0073/0073

INVENTOR: Sachkov, V. V.; Potak, Ya. M.; Lavrov, V. I.; Popova, L. S.; Grashchenkov, P. M.

ORG: none

TITLE: Stainless steel. Class 40, No. 177081

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 73

TOPIC TAGS: steel, stainless steel, chromium containing steel, nickel containing steel, manganese containing steel

ABSTRACT: This Author Certificate introduces a stainless steel with improved mechanical properties that contains 0.05—0.09% carbon, 1% max manganese, 0.7% max silicon, 15.5—17.5% chromium, and 5.0—8.0% nickel. [AZ]

SUB CODE: 11/ SUBM DATE: 01Jun63/ ATD PRESS: 4190

Card 1/1 UDC: 669.15'24'26—194

TUMANOV, A.T., glav. red.; VYATKIN, A.Ye., red.; GARBAR, M.I., kand. tekhn. nauk, red.; ZAYMOVSKIY, A.S., red.; KARGIN, V.A., red.; KISHKIN, S.T., red.; KISHKINA-RATNER, S.I., doktor tekhn. nauk, red.; PANSHIN, B.I., kand. tekhn. nauk, red.; ROGOVIN, Z.A., doktor khoz. nauk, red.; SAZHIN, N.P., red.; SKLYAROV, N.M., doktor tekhn.nauk, red.; FRIDLYANDER, I.N., doktor tekhn. nauk, red.; SHUBNIKOV, A.V., red.; SHCHERBINA, V.V., doktor geol.-miner. nauk, red.; SHRAYBER, D.S., kadn. tekhn.nauk, red.; GENEL', S.V., kand. tekhn.nauk, red.; NOVIKOV, A.S., doktor khoz. nauk, red.; KITAYGORODSKIY, I.I., doktor tekhn. nauk, red.; ZHEREBKOV, S.K., kand. tekhn. nauk, red.; BOGATYREV, P.M., kand. tekhn. nauk, red.; BUROV, S.V., kand. tekhn. nauk, red.; POTAK, Ya.M., doktor tekhn. nauk, red.; KUKIN, G.N., doktor tekhn. nauk, red.; KOVALEV, A.I., kand. tekhn. nauk, red.; ZENTSEL'SKAYA, Ch.A., tekhn. red.

[Building materials; an encyclopedia of modern technology] Konstruktsionnye materialy; entsiklopediia sovremennoi tekhniki. Glav. red. Tumanov, A.A. Moskva, Sovetskaia entsiklopediia. Vol.1. Abliatsiia - Korroziia. 1963. 416 p. (MIRA 17:2)

1. Chlen-korrespondent AN SSSR (for Kishkin).

SACHKOV, V.V., inzh.; LAVROV, V.I., inzh.; POTAK, Ya.M., kand.tekhn.nauk

Kh17N4AG9 steel (EI878) is a substitute for steel, of types 1Kh18N9 and 1Kh18N9T. Metalloved. i term. obr. met. no.11:30-33 N '61. (MIRA 14:12)

(Chromium-nickel steel--Testing)
(Nickel steel)

POTAKHIN, N.Ye.

Representation of the mechanism of the formation and growth of fatigue microcracks based on the dislocation theory. Trudy LIEI no.29:161-165 [i.e. 39] '62. (MIRA 16:6)
(Metals--Fatigue) (Dislocations in metals)

L 18100-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/HW
ACCESSION NR: AP3004598 S/0126/63/016/001/0102/0106

60
59

AUTHORS: Potakhin, N. Ye.; Terminasov, Yu. S.

TITLE: Microscopic investigation of slip plane development in copper during fatigue tests.

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 1, 1963, 102-106

TOPIC TAGS: copper, fatigue test, slip plane , development

ABSTRACT: The development of progressive failures in polycrystalline sheet copper (99.97% pure) was studied. The samples were subjected to a symmetrical bending at 4000 stress-cycles per minute in a specially built fatigue testing machine maintaining a constant bending amplitude (2mm). The results showed that slip planes begin to develop after 5000 cycles. In some grains they are broad but widely spaced, in others they are faintly defined but closely spaced. After 30 000 cycles the plastic deformation proceeds rapidly; structure of metal changes little during further bending, but slip lines become more numerous and broader. They are limited basically to the slip planes in the areas with broad slip lines. After 200 000 cycles microcracks are formed in the regions of thin and broad line

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L 18100-63
ACCESSION NR: AP3004598

bands. In some slip bands the material is "drawn in" while in others it is "squeezed out". The slip lines produced by fatigue differ considerably from those caused by a static tensile stress. The fatigue bands have a characteristic laminated-block structure, while the tensile stress bands are formed by smooth thin lines. Orig. art. has: 4 figures.

ASSOCIATION: Petrozavodskiy gosudarstvenny*y universitet (Petrozavodsk State University)

SUBMITTED: 29Oct62 DATE ACQ: 27Aug63 ENCL: 00

SUB CODE: ML NO REF SOV: 005 OTHER: 007

Card 2/2

POTAKHIN, N.Ye.

Electron microscopy of the shearing fatigue band structure in copper and armco iron. Fiz. met. i metalloved. 16 no.3: 489-490 S '63. (MIRA 16:11)

1. Petrozavodskiy gosudarstvennyy universitet.

POTAKHIN, M.Ye.; TERMINASOV, Yu.S.

Microscopy of the development of slip lines in iron and magnesium during fatigue tests. Report no. 2. Fiz. met. i metalloved. 16 no.3:491-493 S '63. (MIRA 16:9)

1. Petrozavodskiy gosudarstvennyy universitet.

POTAKHIN, N.Ye.

Methods of separation of effects of the second kind. Izv. vys. ucheb. zav.; fiz. 8 no.6:152-156 '65.
(MIRA 19:1)

1. Petrozavodskiy gosudarstvennyy universitet. Submitted March 3, 1964.

S/857/62/000/029/003/003
E193/E383

AUTHOR: Potakhin, N.Ye.

TITLE: Dislocation mechanism of nucleation and growth of microscopic fatigue cracks

SOURCE: Leningrad. Inzhenerno-ekonomicheskiy institut. Trudy. no. 29. 1962. Primeneniye rentgenovykh luchey k issledovaniyu materialov. 161 - 165

TEXT: An attempt is made to formulate the mechanism of nucleation and growth of microscopic fatigue cracks in the framework of concepts postulated by Stroh (Advances in Physics, 6, 418, 1957) for the nucleation of cracks in a statically stressed material. The outline of the argument put forward by the present author is as follows: when the stress applied to a tensile-test piece reaches a certain critical value, it activates a Frank-Reed source. The movement of dislocations generated by this source can, however, be inhibited by an "atmosphere" of structural defects in the vicinity of the source, as a result of which the generation of new dislocations ceases. If the dislocations are to"break through" this atmosphere, and if the Frank-Reed source

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is to be active again, an increase in the externally applied stress is necessary. The specific nature of cyclic loading is that it does not promote the formation of such "atmospheres"; if and when they are formed, they become "resolved" as the number of cycles increases, i.e. increasing the number of cycles in a fatigue test has the same effect as increasing the stress in a static test. Consequently, the movement of dislocations along the slip planes and piling-up of dislocations on obstacles (such as grain boundaries, etc.), which lead to the onset of tensile stresses and nucleation of a crack, can take place in a cyclically stressed material at stresses considerably lower than in the case of a statically stressed metal. The dual nature of fatigue consists of the fact that the cracks can be formed as a result of both normal and tangential stresses. Starting from these premises, the present author derives a simplified expression for the fatigue curve. Since piling-up of dislocations plays the predominant part in the formation of microscopic fatigue cracks, he starts by considering the rate at which the dislocation density increases with the number of cycles. This, in the first approximation, is given by:

$$d\rho/dn = A(\sigma - \sigma_{-1})^K \cdot n^q \qquad (1)$$

where ρ is the dislocation density in the pile-up region, σ_{-1} is the fatigue limit, σ the applied stress, n number of cycles and A is a constant. Integrating this equation for the limit conditions and introducing some simplifications, the author derives the final formula in the form:

$$n_i = \text{const } (\sigma_i - \sigma_{-1})^{-m} \qquad (6)$$

where n_i and σ_i are the number of cycles and the applied stresses at which fatigue fracture occurs. This formula (which has been found to be in good agreement with experiment) is identical with that obtained by Oding (DAN SSSR, v. 105, no. 6, 1955) who based his calculations on the density of vacancies in the pile-up regions. There are 3 figures.

POTAKHIN, M.Ye.; SHIVRIN, O.N.

Fourier analysis methods for interference lines blurred by distortions and dispersion blocks. Nauch.dokl.vys.shkoly; met. no.2: 186 -188 '59. (MIRA 12:5)

1. Petrozavodskiy gosudarstvennyy universitet.
(Crystallography, Mathematical)

POTAKHIN, N.Ye.; TERMINASOV, Yu.S.

Microscopy of the slip band development in copper during fatigue tests. Part 1. Fiz. met. i metalloved. 16 no.1:102-106 Jl '63. (MIRA 16:9)

1. Petrozavodskiy gosudarstvennyy universitet.
(Copper--Metallography)
(Deformations (Mechanics))

L 00301-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) Pf-4
IJP(c) JD/HW/EM

ACCESSION NR: AP5004277 S/0126/65/019/001/0150/0152

AUTHOR: Potakhin, N. Ye.

TITLE: X-ray study of the low temperature annealing of fatigue tested copper samples

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 1, 1965, 150-152

TOPIC TAGS: x-ray structure analysis, annealing, copper, relaxation process, plastic deformation, metal relaxation

ABSTRACT: Studies of the microscopic development of fatigue processes in metals have shown that if some grains, favorably oriented for the initiation of sliding, are subjected to considerable plastic deformation, the greater part of these grains will remain unaffected by sliding until the very last stages of plastic deformation. In connection with this, certain peculiarities should be expected in relaxation of deformations in the crystal lattice of the metal when it is affected by temperature in comparison with the case where a considerable volume of the sample is included in the deformation, e.g. during static strength tests. Some relaxation (recrystallization) is observed when copper which has been subjected to fatigue hardening at room temperature and lower is annealed at 100°. The remaining

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L 3-301-65
ACCESSION NR: AP5004277

part of the latent energy is liberated at a higher temperature. The authors compare these results with x-ray studies of the change in integral width of the interference lines during low temperature annealing of polycrystalline copper samples which have been subjected to preliminary fatigue deformation by sign-symmetric bending at constant test amplitudes. The samples, which had been previously tested for various numbers of cycles, were annealed at 200° and 50°. For comparison, a study was made of the annealing of a copper sample which had been subjected to preliminary stretching by 15%. Data on the x-ray studies are presented as graphs. An analysis of these data shows that the integral width of line (420) is sharply reduced at both annealing temperatures (50 and 200°) only as the annealing starts. The width of the line then becomes stable. A comparison of the relationships between the width of line (420) and the annealing time at 200° for two specimens which had been subjected to preliminary testing for $3 \cdot 10^4$ and $1 \cdot 10^5$ cycles (the basis for the tests was $2.75 \cdot 10^5$ cycles) indicates that the line width for samples which had been tested for $1 \cdot 10^5$ cycles is reduced more sharply than for the sample which had been tested for $3 \cdot 10^4$ cycles. This phenomenon is explained by the difference in the nature and degree of structural ruptures at various stages of the cyclic deformation.

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L 39301-65
ACCESSION NR: AP5004277

ASSOCIATION: Petrozavodskiy gosuniversitet im. O. V. Kuusinena (Petrozavodsk State University)

SUBMITTED: 13Jul63 ENCL: 00 SUB CODE: MM, AS

NO REF SOV: 004 OTHER: 003

Card 3/3 JO

18(7) SOV/163-59-2-33/48

AUTHORS: Potakhin, N. Ye., Shivrin, O. N.

TITLE: The Method of the Fourier Analysis of Interference Lines Blurred by Distortions and the Dispersity of Blocks (K metodike Fur'ye-analiza interferentsionnykh liniy, razmytykh za schet iskazheniy i dispersnosti blokov)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 2, pp 186-188 (USSR)

ABSTRACT: The solution of some problems, e.g. the investigation of the anisotropy of distortions in different crystallographic directions, is only feasible by an analysis of one line. B. Ya. Pines (Ref 1) suggested methods of approximation for this case to separate the distortion effect and the block effect (determination of the coefficients A_t^d and A_t^{bl}). One of these methods presupposes isomeric blocks so that the dependence of the coefficient A_t^{bl} on t becomes linear with the angle coefficient $\left.\frac{-dA_t^{total}}{dt}\right|_{t=0}$. For the graphic determination of

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this differential quotient, the authors suggested, in a previous paper (Ref 2), a "secant method" in which additional values of A^{total} are computed for t between 0 and 1, and the tangent on the curve $A_t^{total}(t)$ is replaced at t = 0 by a secant which goes through t = 0, t = 0.1 or t = 0.2. In this paper, a new approximation is suggested. Under the assumption of isomeric blocks, a series is derived: $f(t) = a + Bt - aBt^2 + \ldots$ As the coefficients a and B have the order of magnitude $n.10^{-2}$, the linear terms $f(t) = a + Bt$ $\left(a = \frac{dA_t^{total}}{dt}\Big|_{t=0}\right)$ are sufficient for practical purposes. B is the angle coefficient determining the relative microdeformation of the ε-lattice:

$B = k\varepsilon^2$, $\varepsilon = \frac{\sqrt{\overline{\Delta L_o^2}}}{L_o}$. k is a constant factor the value of which can be computed from formulas (91) and (92) indicated by

The Method of the Fourier Analysis of Interference Lines Blurred by Distortions and the Dispersity of Blocks

SOV/163-59-2-33/48

B. Ya. Pines (Ref 1). The method suggested was experimentally checked on steel with the radiation Cr - (211), Fe - (220), Co - (310) and Mo - (651, 732). A diagram shows the function f(t) for different ε. The condition of linearity is well satisfied in the range $0 \leq t \leq 1$. A table compares the values of ε found by the secant method and by the new method. The maximum difference is 8%. Therefore, the method suggested can be used for the determination of the amount of distortion of the lattice. There are 1 figure, 1 table, and 3 Soviet references.

ASSOCIATION: Petrozavodskiy gosudarstvennyy universitet (Petrozavodsk State University)

SUBMITTED: June 2, 1958

Card 3/3

L 22542-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5002342 S/0126/64/018/006/0845/0852

AUTHOR: Potakhin, N. Ye.; Terminasov, Yu. S.

TITLE: X-ray investigation of the fatigue process in polycrystalline copper samples

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 6, 1964, 845-852

TOPIC TAGS: polycrystalline copper, cyclic deformation, fragmentation, microdistortion, plastic deformation, fatigue testing, x ray analysis, fatigue deformation

ABSTRACT: An x-ray study was made of annealed and polished polycrystalline copper samples subjected to cyclic deformation. The form of the distribution function of the intensity of the (420) interference lines remained practically unchanged during fatigue deformation indicating that the distribution of the dimensions of the blocks and the amounts of microdistortions determining the intensity of this line remained unchanged. The diffusion of the line increased sharply only at the very start of the test. Some additional diffusion occurred at the pre-frac-

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L 22542-65
ACCESSION NR: AP5002342

ture stage. The intensity of the diffusion, which indicated the dependence of the rate of fatigue microfracture growth on amplitude and the number of cycles for rupture, increased with increasing amplitude. Correlation was found between microscope and x-ray pictures of the development of plastic deformation. Fragmentation of the crystal blocks and development of microdistortions were parallel in all stage of the test. At the pre-fracture instant the additional increase in microdistortions and crushing of the blocks is associated with the sharp growth of the microfractures. There was no change in the ratio of the intensity of 2 series of reflections during the process of fatigue testing. The intensity of the (420) line increased somewhat at the start of the test, then decreased proportionally to the metal fatigue accumulation, the decrease being more pronounced the greater the amplitude of the test. This decrease was interpreted as resulting from the development of distortions of the third type. Orig. art. has: 4 figures and 1 equation.

ASSOCIATION: Petrozavodskiy gosuniversitate im. O. V. Kuusinena (Petrozavodsk State University)

SUBMITTED: 19Jul63 ENCL: 00 SUB CODE: MM
NR REF SOV: 021 OTHER: 003

Card 2/2

POIAKHINA, L.N.

Effect of copper and molybdenum on the growing and yield of the meadow timothy grass. Uch. zap. Petrozav. gos. un 12 no.3:47-50 '64.

Content of some trace elements in foxtail during its growing. Ibid.:51-53

Effect of trace elements on the carbohydrate metabolism in the foxtail. Ibid.:54-56 (MIRA 19:1)

1. Laboratoriya mikroelementov i kafedra neorganicheskoy khimii Petrozavodskogo gosudarstvennogo universiteta imeni O.V. Kuusinena.

LANTRATOVA, A.S., dotsent; POTAKHINA, L.N.

Manganese content of annual shoots of the Siberian larch.
Uch. zap. Petrozav. gos. un. 12 no.3:72-75 '64.
(MIRA 19:1)

1. Kafedra botaniki i fiziologii rasteniy Petrozavodskogo gosudarstvennogo universiteta imeni O.V. Kuusinena.

TOYKKA, V A., dotsent; POTAKHINA, L.N.

Boron and molybdenum in soils of Sortavala District. Uch. zap. Petrozav. gos. un. 12 no.3:100-101 '64. (MIRA 19:1)

1. Kafedra neorganicheskoy khimii Petrozavodskogo gosudarstvennogo universiteta imeni O.V. Kuusinena.

TOYKKA, M.A., dotsent; POPOVA, A.P.; POTAKHINA, L.N.

Content of total and available manganese in soils of Kondopoga and Medvezh'yegorsk Districts. Uch. zap. Petrozav. gos. un. 12 no.3:102-110 '64. (MIRA 19:1)

1. Kafedra neorganicheskoy khimii Petrozavodskogo gosudarstvennogo universiteta imeni O.V. Kuusinena.

POTAKHINA, L.N.

Effect of trace elements on the growht processes and accumulation of nutrients in foxtail. Uch.zap. Petrozav. gos.un. 11 no.4:62-66 '63.

(MIRA 19:1)

1. Laboratoriya mikroelementov Petrozavodskogo gosudarstvennogo universiteta.

Potakhova, G. I.

7.4300(1136,1145,1043)
21.4210

S/089/60/009/006/010/011
B102/B212

AUTHORS: Vodop'yanov, K. A., Vorozhtsov, B. I., Lavrov, M. D., Nesmelova, Ye. S., Potakhova, G. I.

TITLE: Effect of radioactive irradiation on dielectric properties of electric insulation materials

PERIODICAL: Atomnaya energiya, v. 9, no. 6, 1960, 498-500

TEXT: Since solid organic dielectrics are used as electric insulation materials in devices which are exposed to irradiation, it is important to investigate the effect of irradiation on dielectrics. The authors have investigated the frequency and temperature characteristics of the dielectric constants and the loss angles of polyethylene, fluoroplast-4, and of "product-10" (a mixture of polystyrene and vinyl naphthalene) before and after gamma irradiation at dose rates of 400 - 1200 r/min and doses of 2000 - 100,000 r. A 15-Mev betatron was used as radiation source. The specimens were 1-2 mm thick discs. The electrophysical properties of these dielectrics have been analyzed 1-3 hr after irradiation. The frequency dependence of ε and tan δ hardly changed for doses up to

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Effect of radioactive...

S/089/60/009/006/010/011
B102/B212

50,000 r. The loss angle of fluoroplast-4 increased a little at 10^7 cps and 10^6 r, and the other materials showed changes within the limits of error of measurement. Such a radiation stability was observed at various temperatures. ε changed a little in all substances under the action of temperature and irradiation. The frequency and temperature dependence of tan δ, ε, and resistivity has also been studied for glass textolite CKM-1 (SKM-1) before and after gamma irradiation. At low frequencies, it showed an increase in the loss angle (and a decrease in resistivity) after irradiation. Similar results have been obtained for the plastics АГ-4 (AG-4), К-211-3 (K-211-3), К-114-35 (K-114-35), ФКПМ-25 (FKPM-25) which are produced from phenol-formaldehyde resins. The loss angle in these materials is determined by relaxation processes, as was shown by tests at -60°C. At certain frequencies, polyamide-68 showed an affection on the temperature dependence of tan δ (see Fig. 6). Similar effects have been observed in other organic, polar dielectrics, such as PVC, Lavsan, and FKPM-25. Two organo-silicon resins, 14р-2 (14r-2) and 14р-6 (14r-6), have also been studied. The first had been produced from organo-silicon synthetic rubber, titanium dioxide, and benzoyl peroxide, and the second

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Effect of radioactive...

S/089/60/009/006/010/011
B102/B212

contained white soot and zinc white instead of titanium dioxide. Compared with the latter, the first showed a smaller resistivity and a smaller tan δ. But both materials show a decrease of the loss angle with increasing frequency. The irradiation (50,000 r) brought about a decrease of tan δ for 14r-6 and an increase of it for 14r-2 at all frequencies. The dielectric losses in these resins exhibit an ohmic character. The authors thank S. I. Ol'shanskaya, T. G. Mikhaylova, L. T. Murashko, and A. I. Tovbina for their assistance. There are 7 figures.

SUBMITTED: December 1, 1959

Card 3/3

13537
S/196/62/000/023/004/006
E194/E155

15.8500

AUTHORS: Vodop'yanov, K.A., Vorozhtsov, B.I., Potakhova, G.I., Lavrov, M.D., Nesmelova, Ye.S., Nesterov, V.M., Vorozhtsova, I.G., Ol'shanskaya, N.I., Zimina, Ye.A., Mikhaylova, T.G., Sitozhevskaya, G.V., and Filatov, I.S.

TITLE: The influence of betatron radiation on the dielectric properties of certain electrical insulating materials

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.23, 1962, 12-13, abstract 23 B 67. (In collection: Elektron. uskoriteli (Electronic Accelerators), Tomsk, Tomskiy un-t, 1961, 308-318)

TEXT: The temperature and frequency characteristics of electrical insulating materials were investigated before and after γ-irradiation at dosages ranging from 10^4 to 2 x 10^5 rads with a dosage rate ranging from 300 to 1300 rads/minute at temperatures of -60, -20 and +60 °C and under tropical conditions (40 °C and relative humidity of 98%); the source of radiation was a

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for the non-irradiated material. Irradiation of varnishes K-47, 976-1, and MGM-16 (MGM-16) under various conditions caused no change in their electrical insulating properties. Irradiation of steatite ceramic (1% BaO, 91.6% Onot talc, 5.2% kaolin, 3.2% boracite) (with a dosage of 2 x 10^5 rads) did not alter the shape of the temperature curve of tan δ (measured at 10^7 c/s) either in weak fields (945 V/cm) or in strong (1890 V/cm). With a dosage of 2.12 x 10^7 rads, tan δ measured at 945 V/cm was not altered at low temperatures but increased appreciably at temperatures above 400 °C.
13 illustrations. 31 references.

[Abstractor's note: Complete translation.]

Card 3/3

43107

15.8530

S/181/62/004/011/002/049
B102/B104

AUTHORS: Nesterov, V. M., Nesmelova, Ye. S., Ol'shanskaya, N. I., Mikhaylova, T. G., and Potakhova, G. I.

TITLE: Reversible electrical effects produced by radiation in dielectrics

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3010 - 3017

TEXT: The authors investigated the behavior of the electrical parameters ε, $\tan\delta$, and σ of various rubber types, fluoroplastics, polyethylene, polychlorvinyl, quartz single crystals and ЭД-6(ED-6) compound before, during and after γ-irradiation under various temperature conditions. With doses of 10^5 - 10^6 rad the maximum irradiation intensity was 10-15 r/sec. Up to doses of 10^6 rad, the parameters changed reversibly at the moment when irradiation began. The following effects were observed: σ jumped up to a definite height when irradiation started and dropped down to the starting value when it was switched off. $\tan\delta$ increased in most of the objects studied. In some samples (polyethylene, polychlorvinyl, ТСШ -35

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L 24360-66 EWT(m)/EWP(w)/EPF(n)-2/T/EWP(t) IJP(c) JD/GG

ACC NR: AP6008119 SOURCE CODE: UR/0139/66/000/001/0190/0191

AUTHORS: Krivov, M. A.; Potakhova, G. I.; Rybkina, L. P. 49 48

ORG: Siberian Physicotechnical Institute im. V. D. Kuznetsov (Siberskiy fiziko-tekhnicheskiy institut) B

TITLE: On the influence of gamma radiation on the microhardness of silicon 19 27 18

SOURCE: IVUZ. Fizika, no. 1, 1966, 190-191

TOPIC TAGS: silicon, hardness, gamma irradiation, crystal dislocation, carrier density, Hall effect, crystal defect

ABSTRACT: The authors have measured the microhardness of n- and p-type silicon before and after exposure to different doses of γ radiation. Since γ radiation can produce additional dislocations and change the carrier density, which in turn influences the microhardness, these quantities were also measured simultaneously with the microhardness. The samples of each type used for all the investigations were cut from a single plate. In all cases the microhardness

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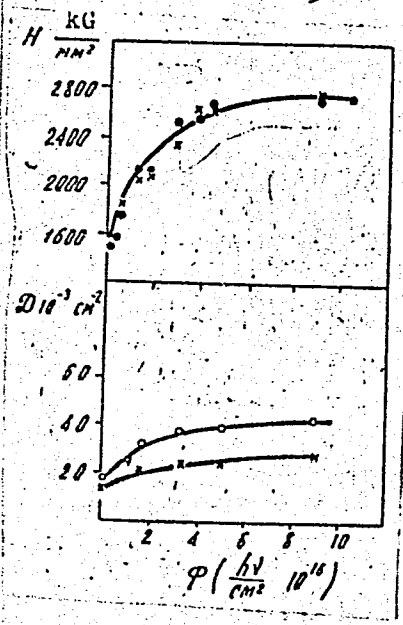

Figures 1 and 2. Microhardness (H) and dislocation density (V) against the integral γ-quantum flux (φ).

increased with increasing radiation dose (Fig. 1). The change in microhardness can be attributed to three causes -- change in carrier density, appearance of displaced atoms, and change in dislocation density. Hall-effect measurements have shown that the change in carrier density does not exceed 6 -- 8% and is comparable with the measurement error. The displaced-atom density increases in accordance with theory in proportion to the integral γ-quantum flux, and the

L 24360-66
ACC NR: AP6008119

change in the dislocation density is shown in the figure. It is therefore concluded that the increase in microhardness is due to the increased number of defects in the structure, caused by a simultaneous increase in the dislocation density and the appearance of a large number of displaced atoms. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/ SUBM DATE: 18Dec64/ ORIG REF: 012/ OTH REF: 003

Card 3/3

ACC NR: AP700573 SOURCE CODE: UR/0139/66/000/006/0055/0061

AUTHOR: Krivov, M. A.; Potakhova, G. I.

ORG: Siberian Physicotechnical Institute im. V. D. Kuznetsov (Sibirskiy fiziko-tekhnicheskiy institut)

TITLE: Effect of x-ray irradiation on the electrophysical properties of silicon and p-n-type silicon junctions Part I Electrophysical parameters of silicon exposed to x-ray irradiation.

SOURCE: IVUZ, Fizika, no. 6, 1966, 55-61

TOPIC TAGS: pn silicon, pn junction, pn conductivity, silicon, silicon single crystal

ABSTRACT: This study presents the results of an investigation of the effect of x-ray irradiation on conductivity, concentration of charge carriers, and their mobility in a single silicon crystal with p-n type conductivity. It is shown that the changes in parameters, caused from x-ray irradiation, depend on irradiation intensity and similarity in p and n-type silicon. The changes in charge carrier

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